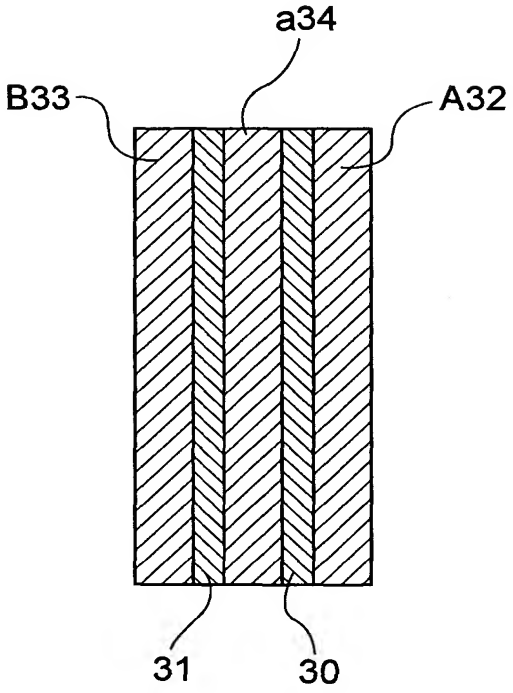
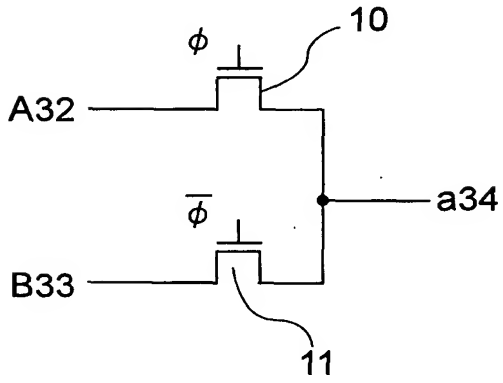
FIG. 1



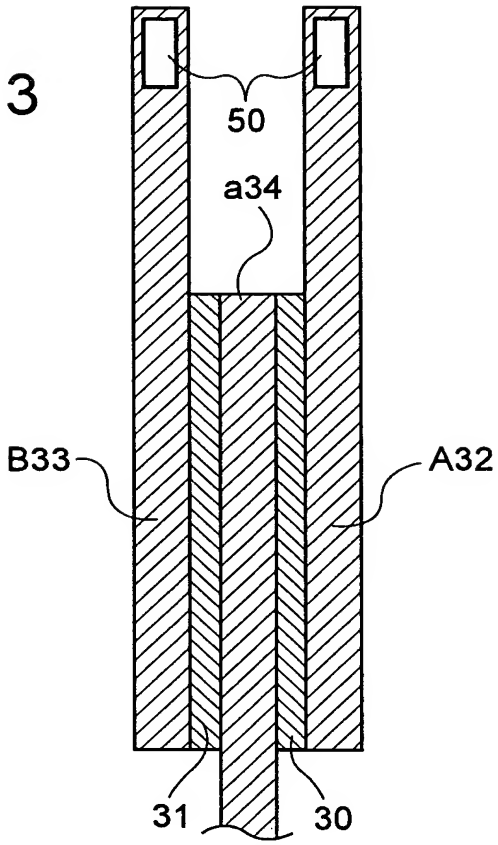
LAYOUT ACCORDION TO FIRST ENBODIMENT

FIG. 2



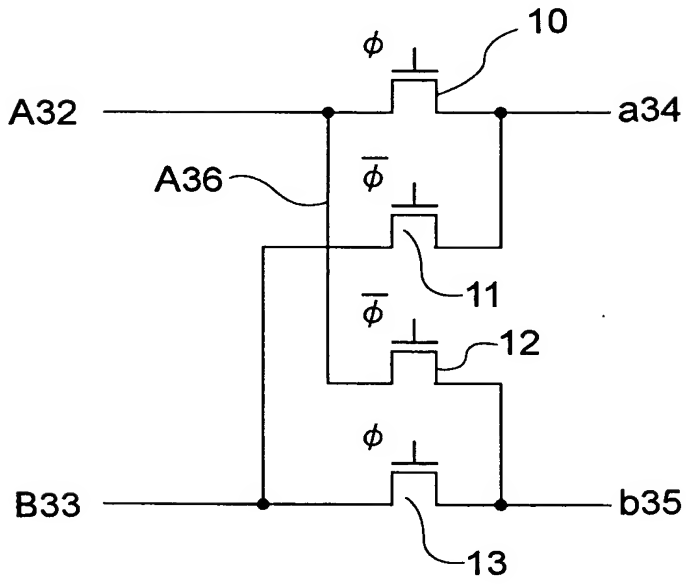
WIRING SWITCH CIRCUIT

FIG. 3



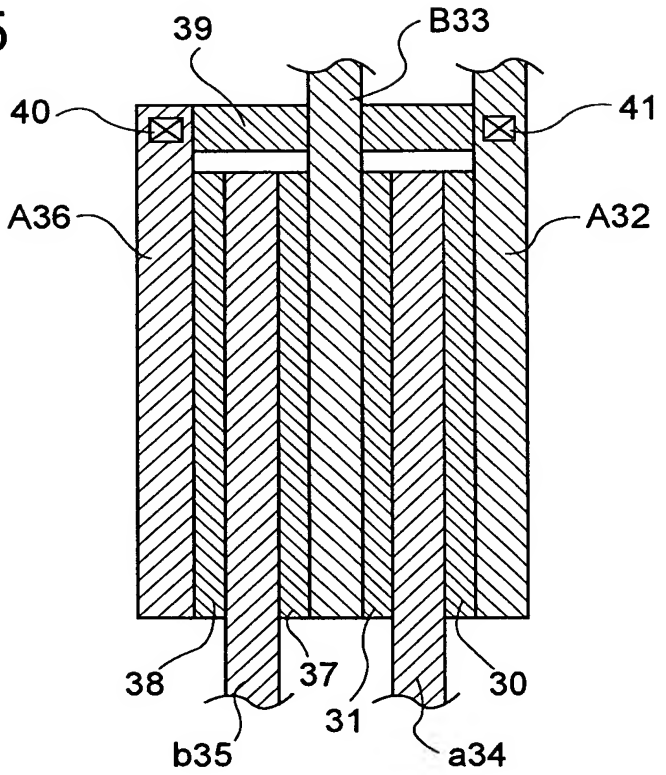
LAYOUT ACCORDION TO SECOND ENBODIMENT

FIG. 4



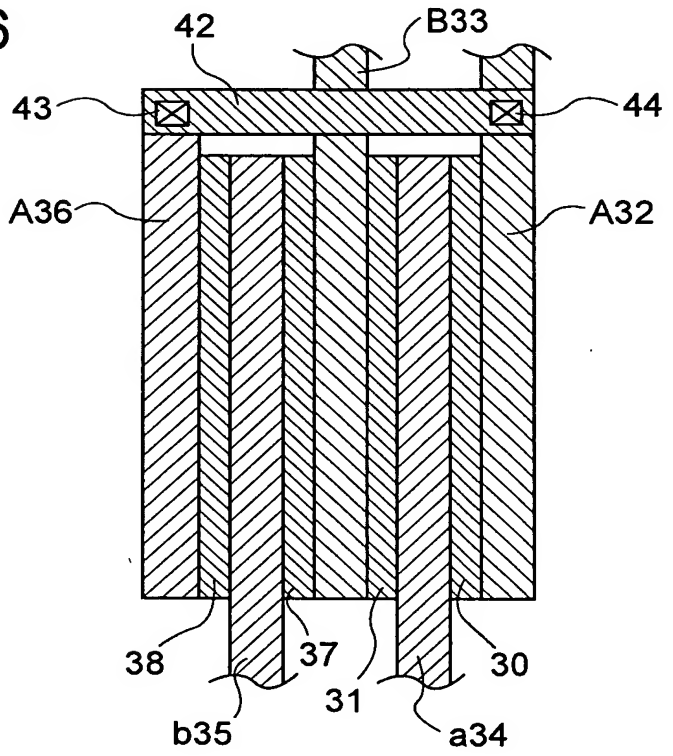
WIRING SWITCH CIRCUIT

FIG. 5



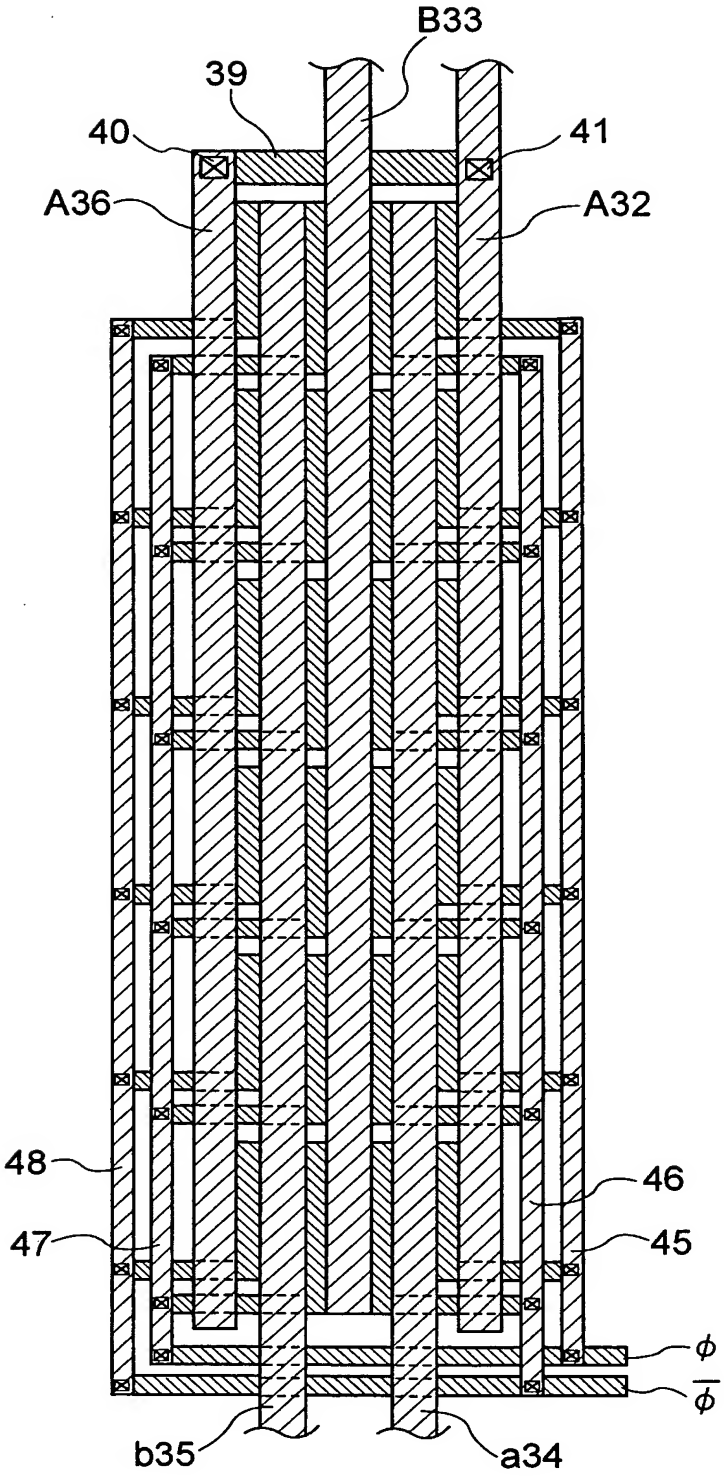
LAYOUT ACCORDION TO THIRD ENBODIMENT

FIG. 6



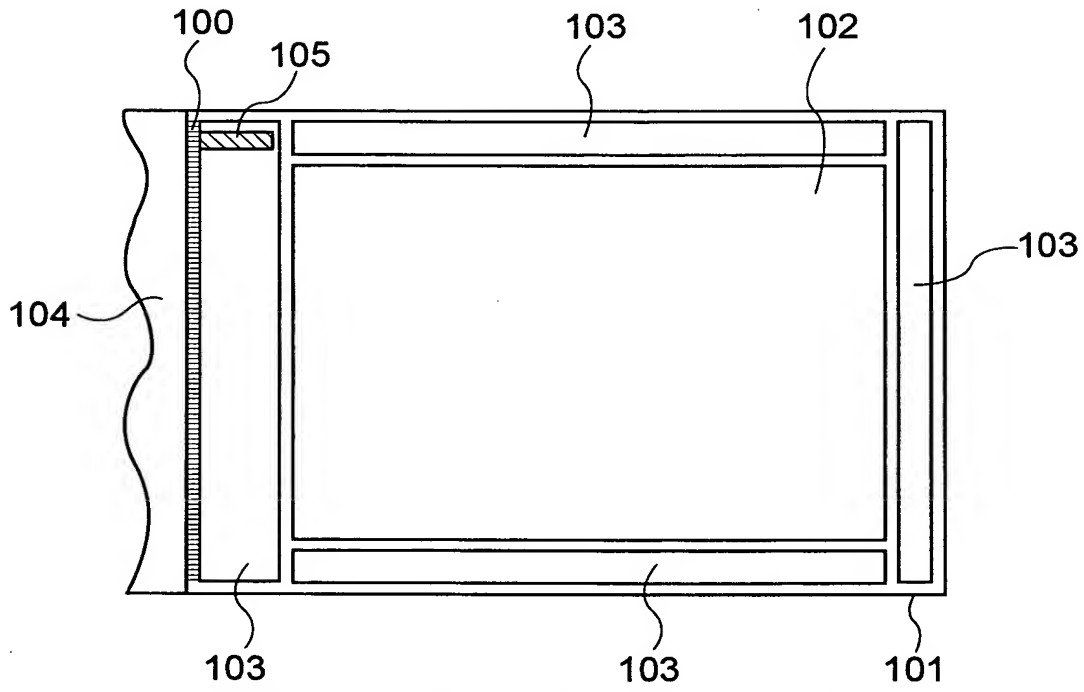
LAYOUT ACCORDION TO THIRD ENBODIMENT

FIG. 7



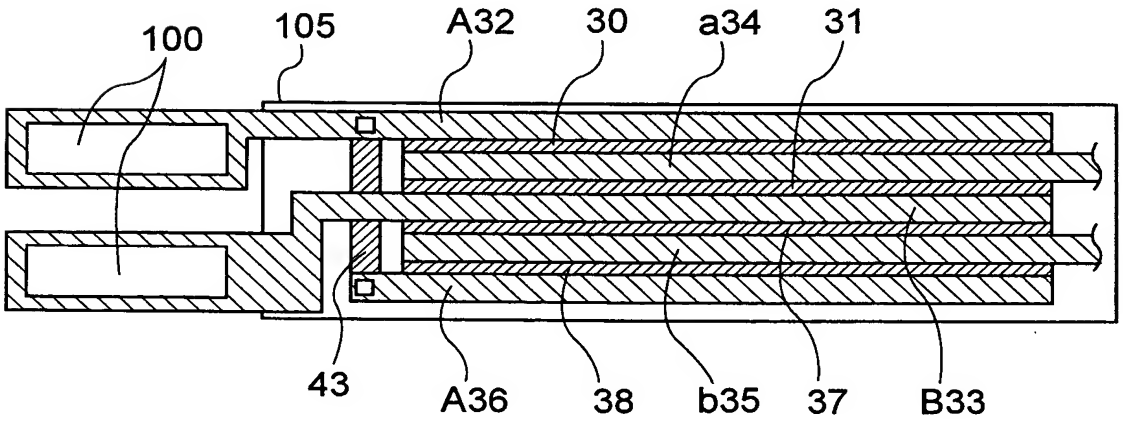
LAYOUT ACCORDION TO FOURTH ENBODIMENT

FIG. 8



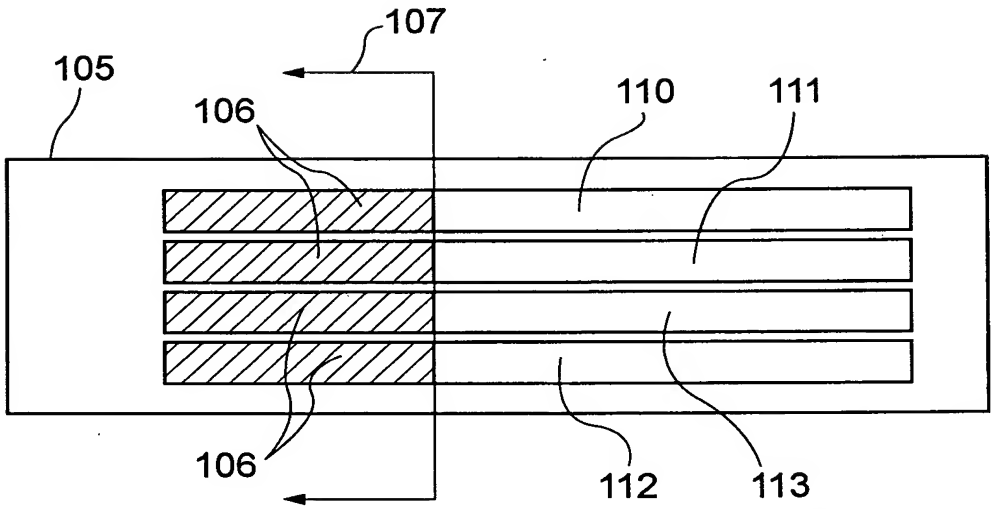
EXAMPLE OF CIRCUIT LAYOUT OF DISPLAY OR SENSOR ACCORDING TO FIFTH EMBODIMENT

FIG. 9



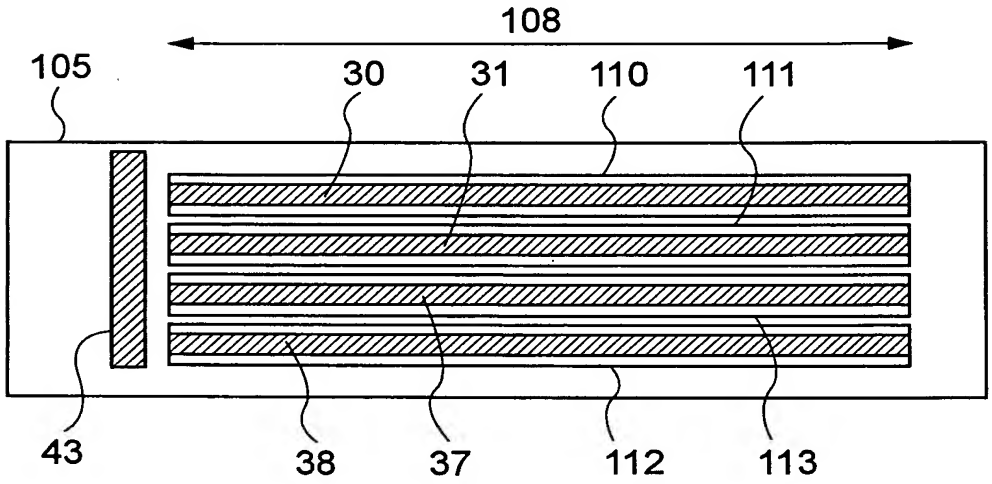
ENLARGED DIAGRAM OF CIRCUIT LAYOUT OF DISPLAY OR SENSOR

FIG. 10



SILICON POLYCRYSTALLIZATION FOR THIN - FILM TRANSISTOR CIRCUIT

FIG. 11



GATE ELECTRODE FORMING STEP FOR THIN - FILM TRANSISTOR CIRCUIT

FIG. 12

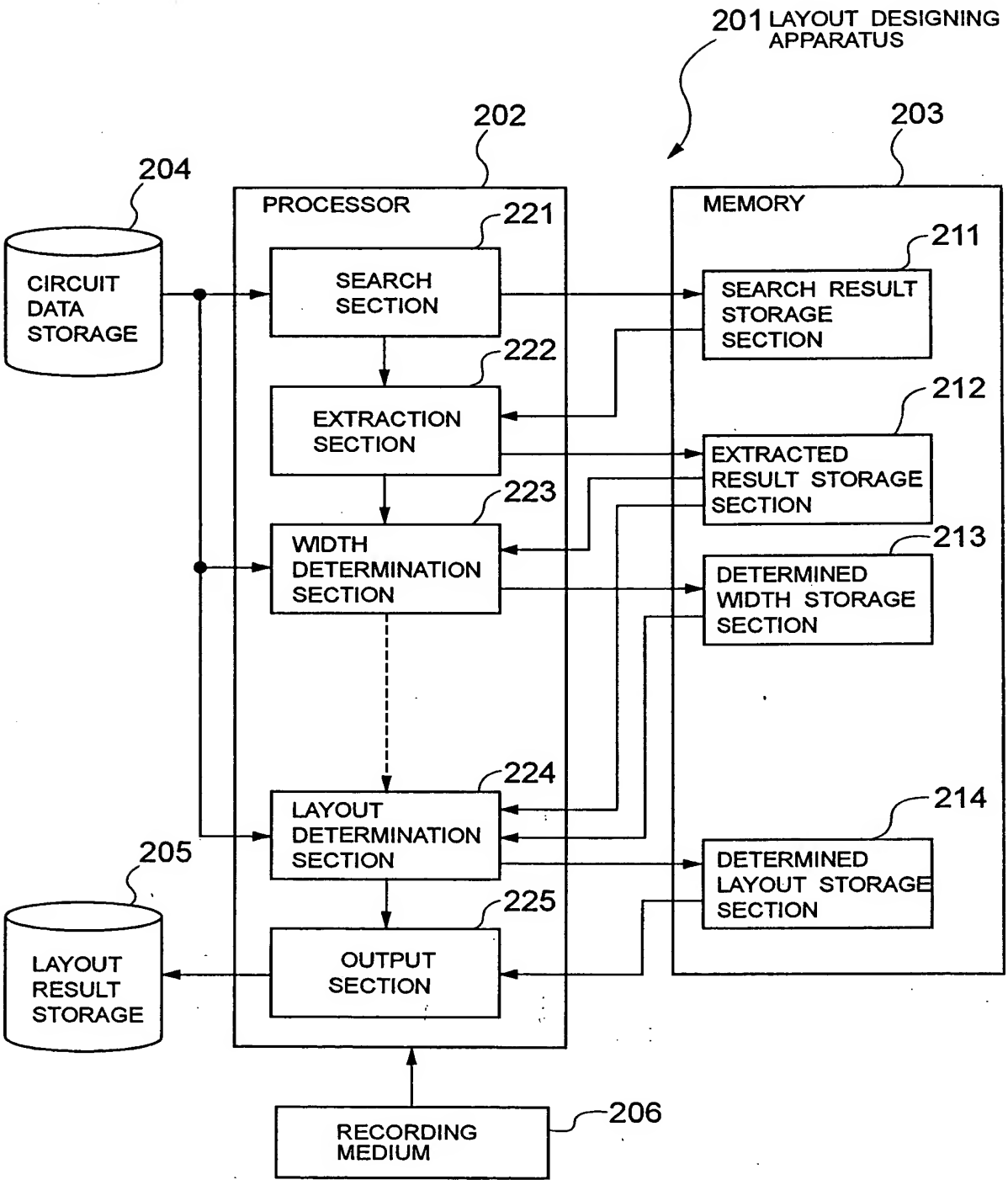

201 LAYOUT DESIGNING APPARATUS
202
203
204
PROCESSOR
MEMORY
221
211
CIRCUIT DATA STORAGE
SEARCH SECTION
SEARCH RESULT STORAGE SECTION
222
212
EXTRACTION SECTION
EXTRACTED RESULT STORAGE SECTION
223
213
WIDTH DETERMINATION SECTION
DETERMINED WIDTH STORAGE SECTION
224
214
205
LAYOUT DETERMINATION SECTION
DETERMINED LAYOUT STORAGE SECTION
225
LAYOUT RESULT STORAGE
OUTPUT SECTION
206
RECORDING MEDIUM

FIG. 13

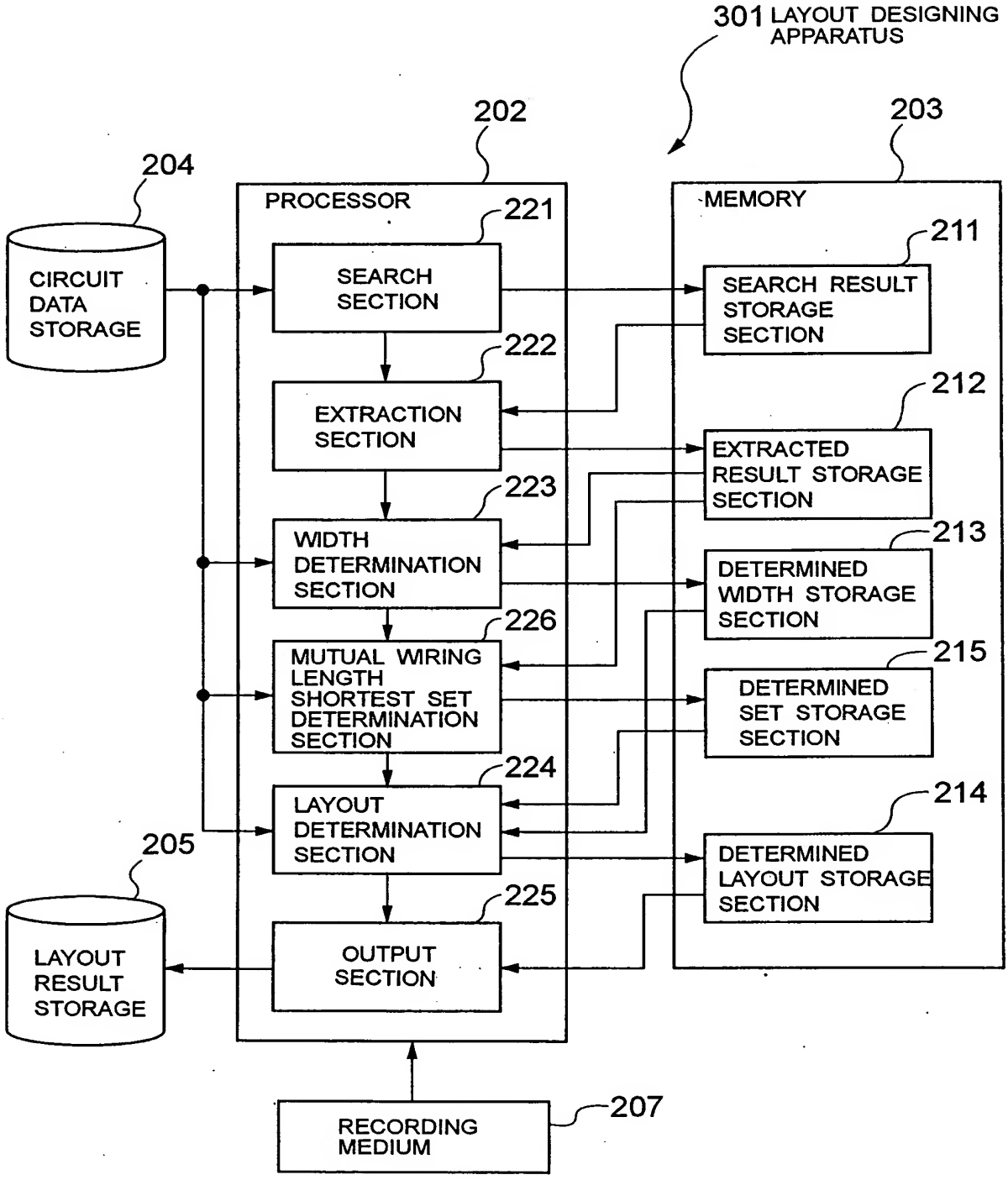
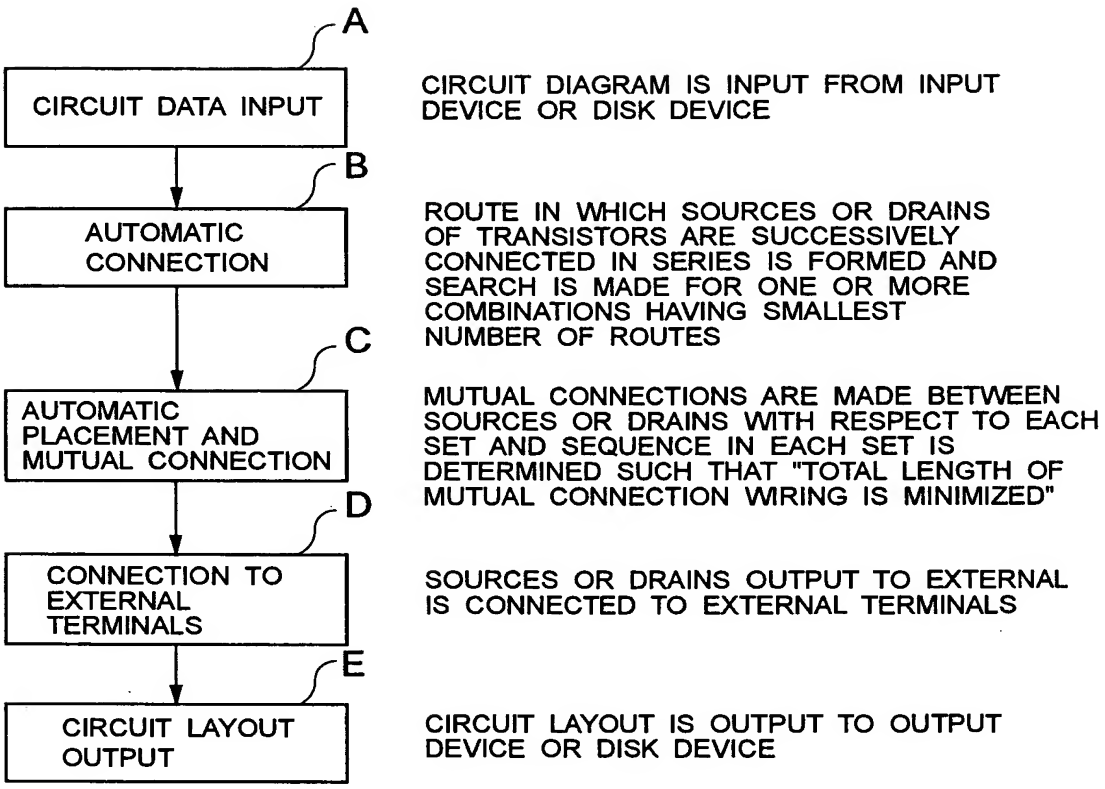
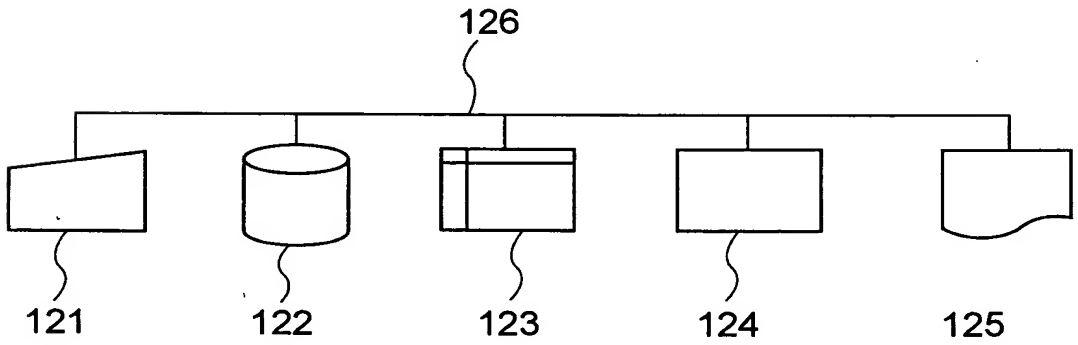

301 LAYOUT DESIGNING APPARATUS
202
203
204
PROCESSOR
MEMORY
221
211
CIRCUIT DATA STORAGE
SEARCH SECTION
SEARCH RESULT STORAGE SECTION
222
212
EXTRACTION SECTION
EXTRACTED RESULT STORAGE SECTION
223
213
WIDTH DETERMINATION SECTION
DETERMINED WIDTH STORAGE SECTION
226
215
MUTUAL WIRING LENGTH SHORTEST SET DETERMINATION SECTION
DETERMINED SET STORAGE SECTION
224
214
LAYOUT DETERMINATION SECTION
DETERMINED LAYOUT STORAGE SECTION
205
225
LAYOUT RESULT STORAGE
OUTPUT SECTION
RECORDING MEDIUM
207

FIG. 14



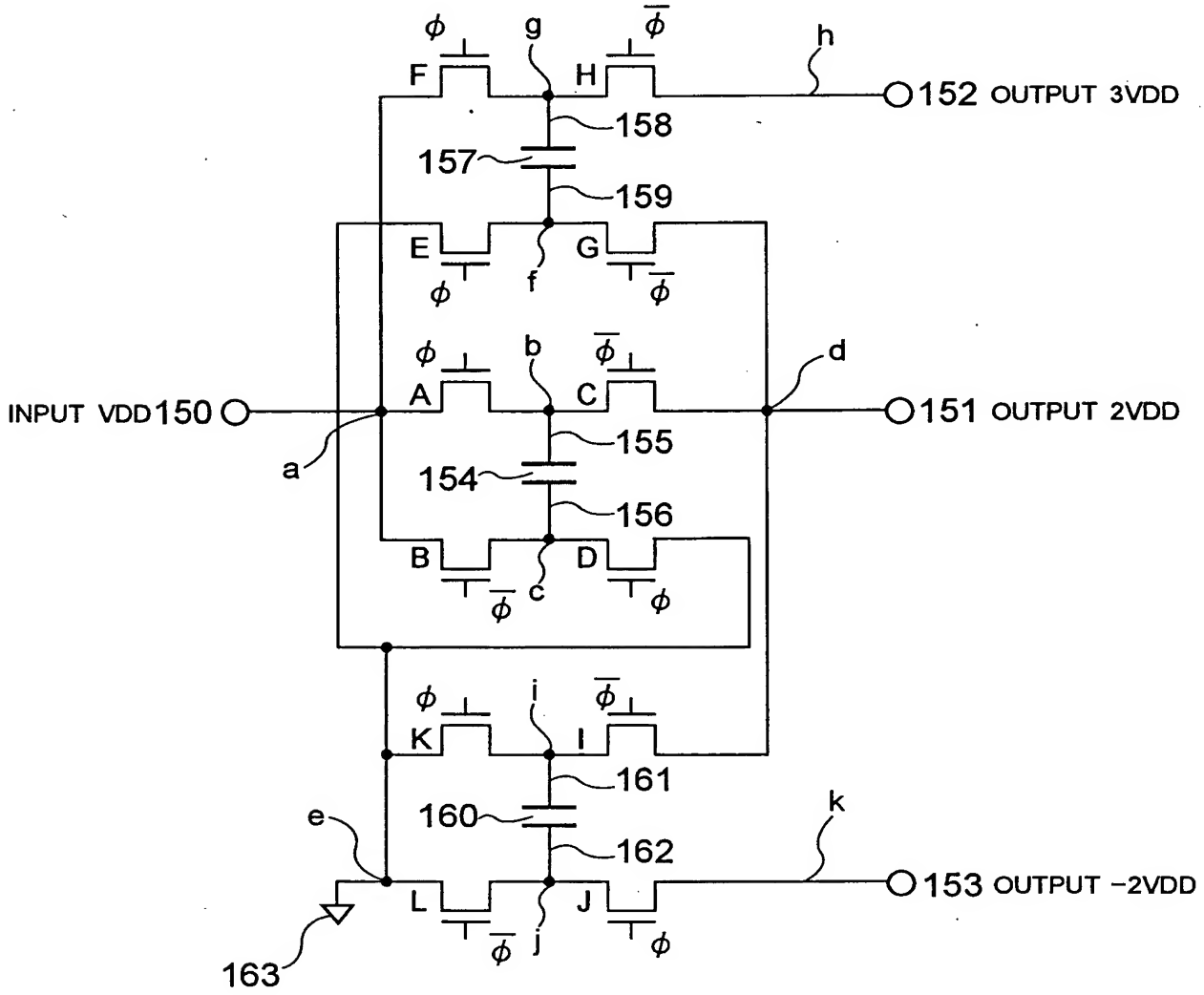
ALGORITHM FOR AUTOMATIC LAYOUT FORMATION

FIG. 15



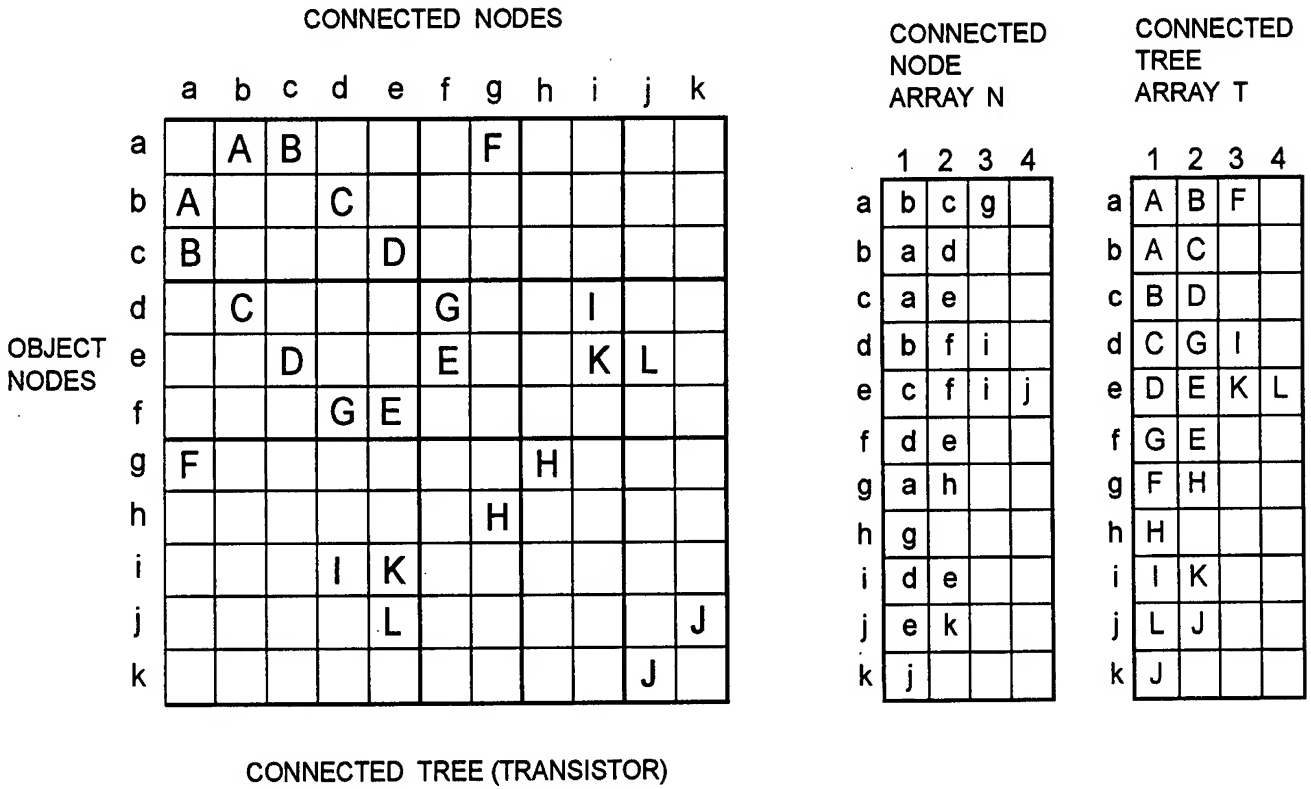
SYSTEM BLOCK DIAGRAM OF AUTOMATIC LAYOUT FORMATION

FIG. 16



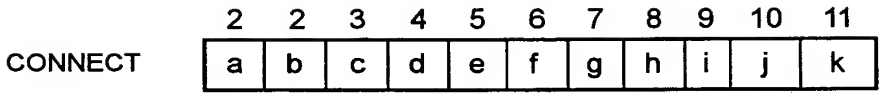
CHARGE-PUMP-TYPE VOLTAGE BOOSTING CIRCUIT

FIG. 17



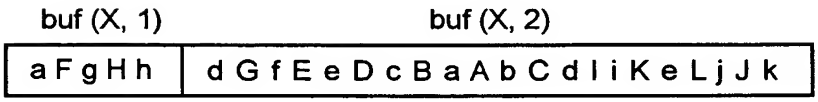
TWO - DIMENSIONAL CIRCUIT NETWORK MAP, CONNECTED NODE ARRAY, AND CONNECTED TREE ARRAY

FIG. 18



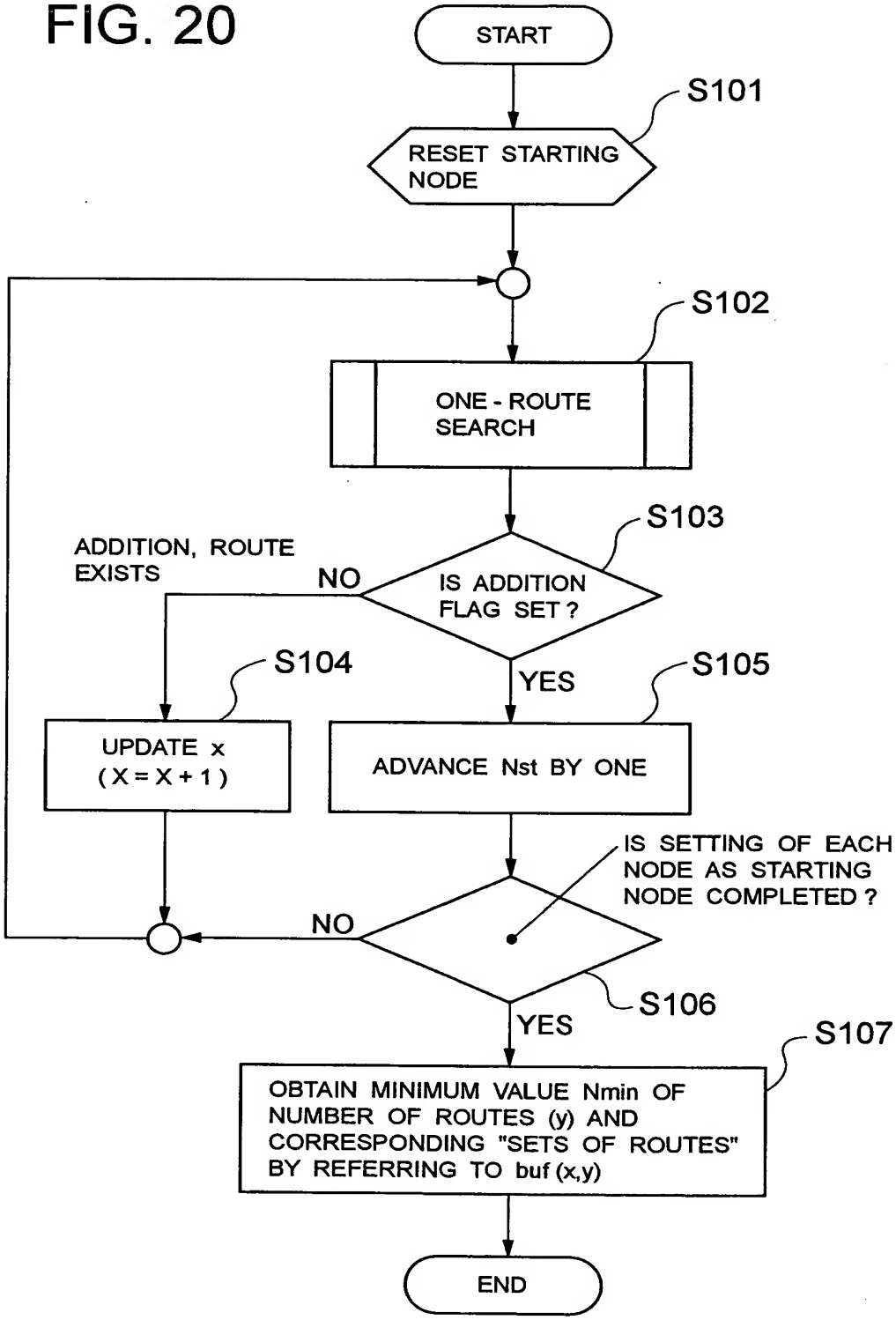
EXTERNALLY CONNECTED NODE ARRAY

FIG. 19



EXAMPLE OF DATA ON "SET OF ROUTES"

FIG. 20



AUTOMATIC CONNECTION
(ALL NODE SEARCH FLOWCHART)

FIG. 21

ONE-ROUTE (WRITTEN WITH SINGLE STROKE) SEARCH FLOWCHART

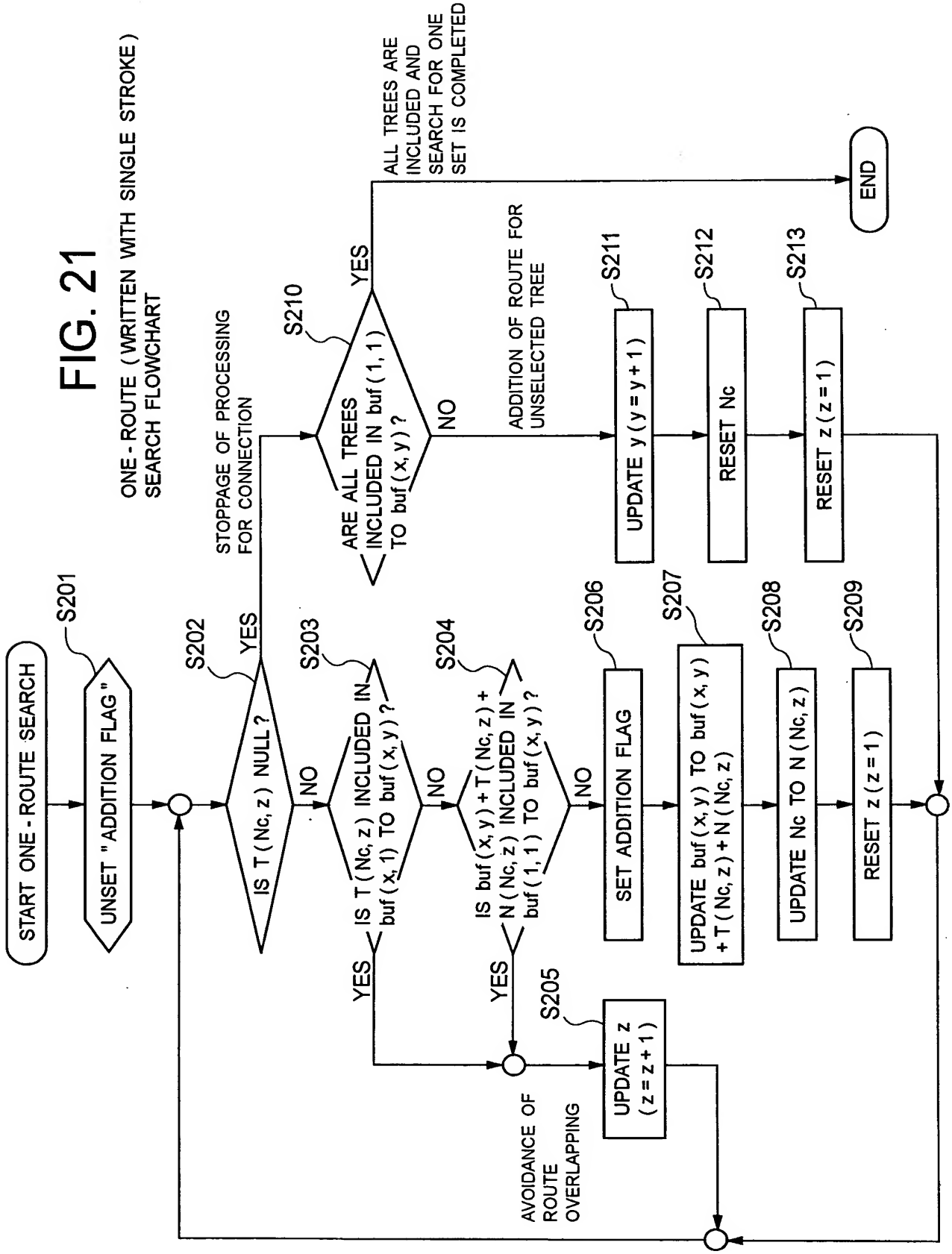


FIG. 22

Nmin = 2

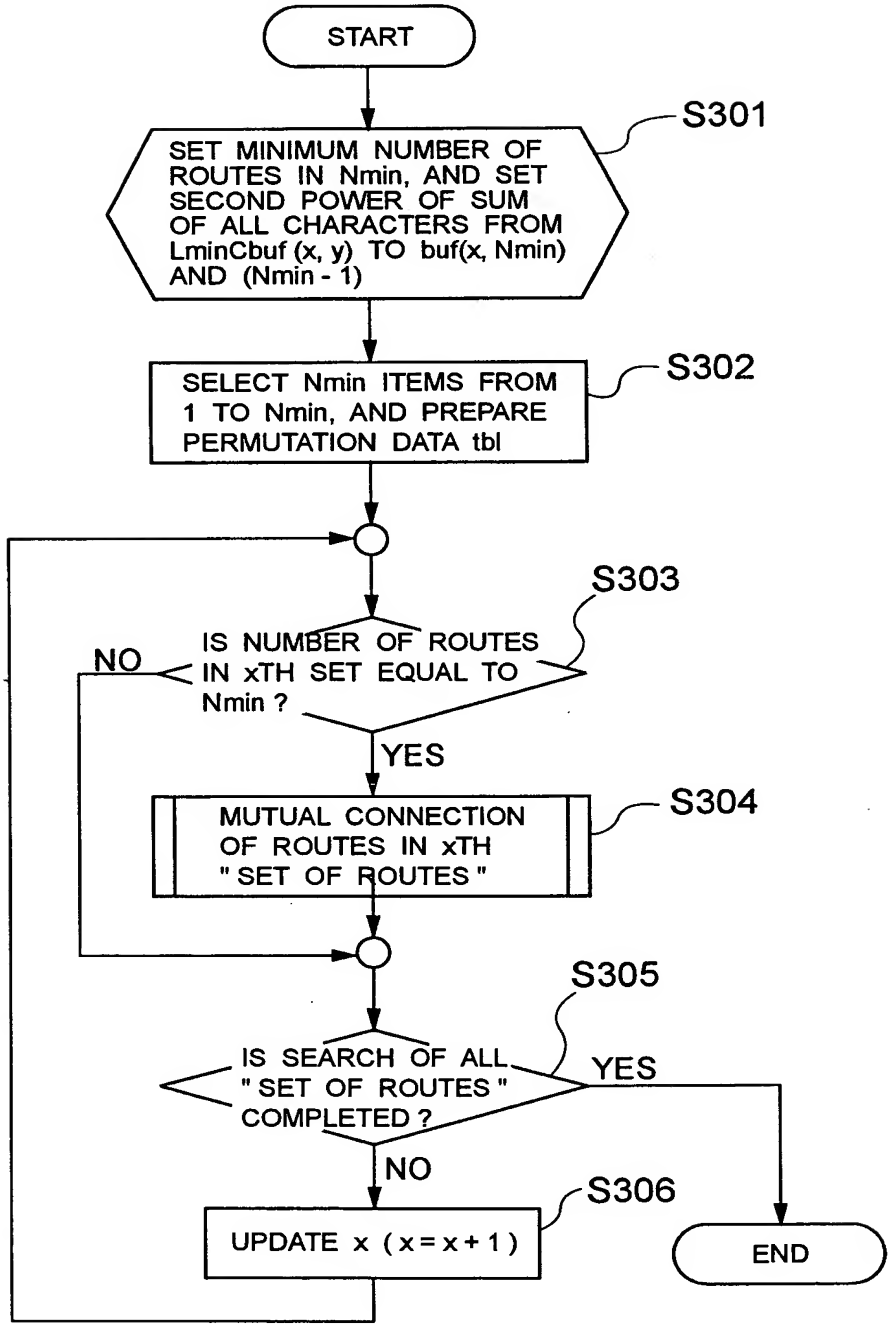
tbl	1	2
1	1	2
2	2	1

Nmin = 3

tbl	1	2	3
1	1	2	3
2	1	3	2
3	2	1	3
4	2	3	1
5	3	1	2
6	3	2	1

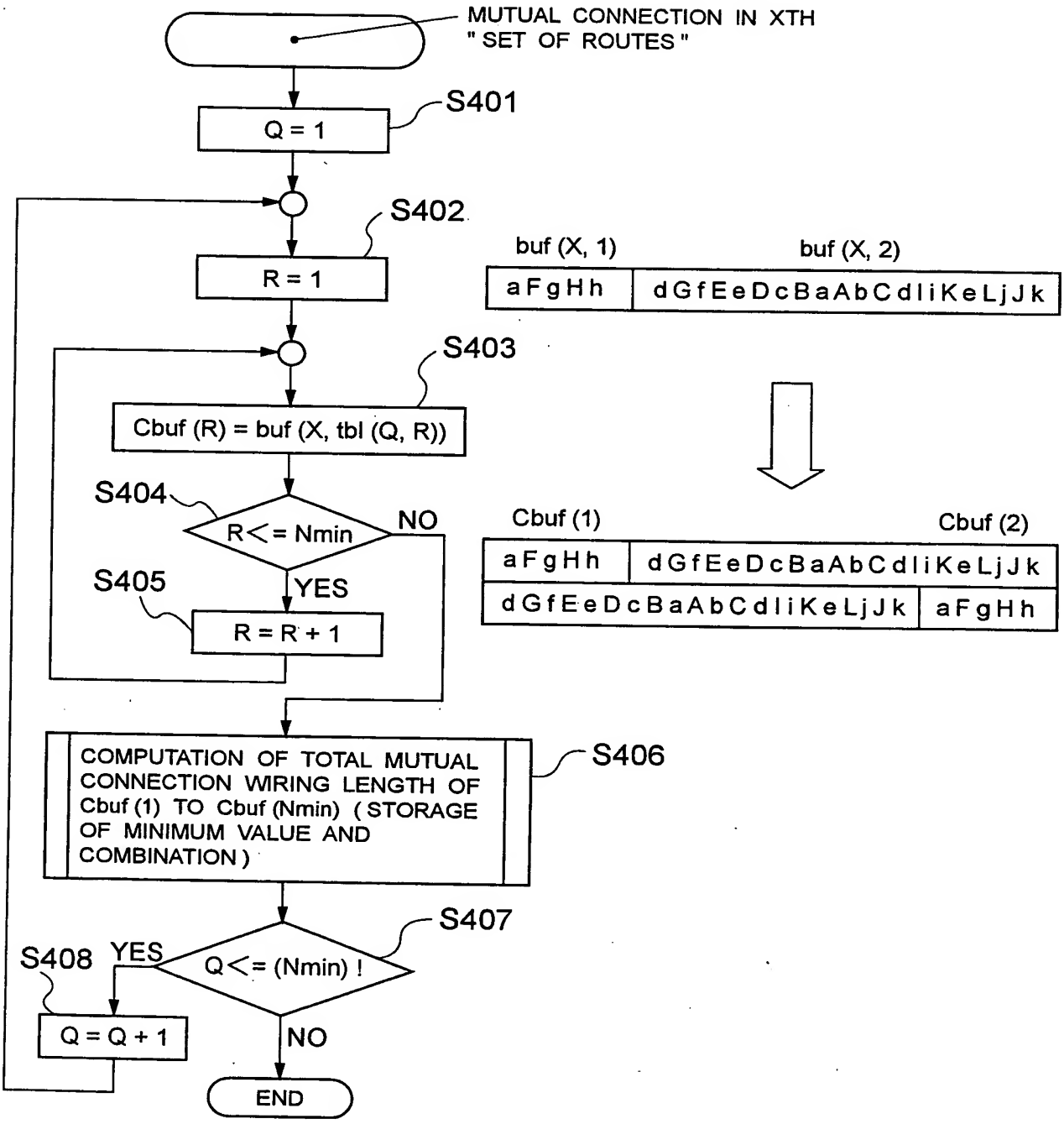
EXAMPLE OF PERMUTATION DATA tbl

FIG. 23



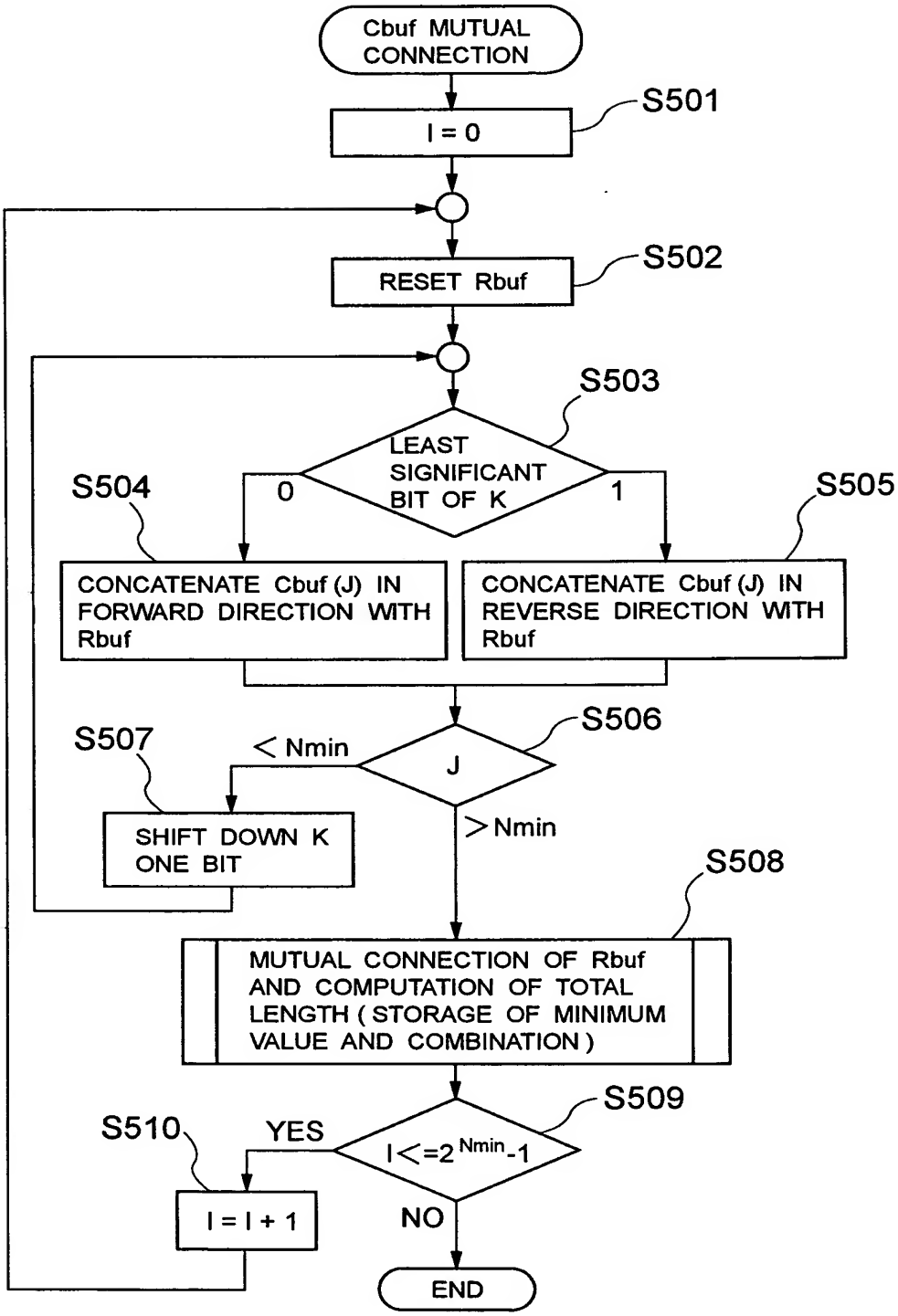
FLOWCHART OF MUTUAL CONNECTION

FIG. 24



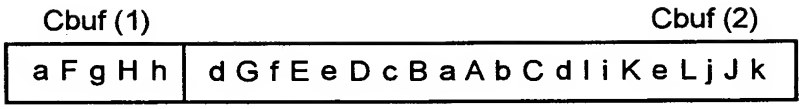
FLOWCHART OF MUTUAL CONNECTION IN XTH SET OF ROUTES

FIG. 25



FLOWCHART OF Cbuf MUTUAL CONNECTION

FIG. 26



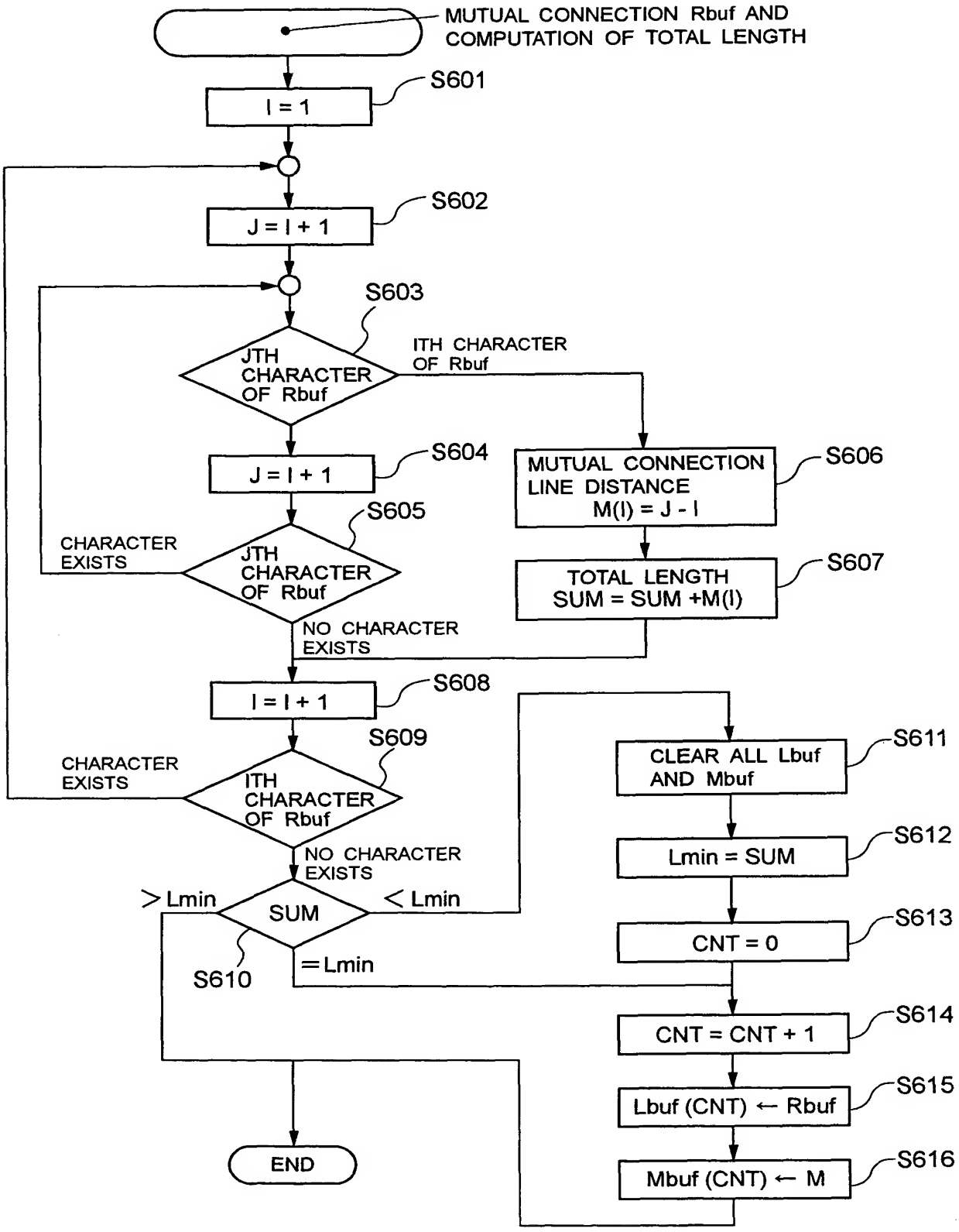
Rbuf

a F g H h ／ d G f E e D c B a A b C d l i K e L j J k
a F g H h ／ k J j L e K i l d C b A a B c D e E f G d
h H g F a ／ d G f E e D c B a A b C d l i K e L j J k
h H g F a ／ k J j L e K i l d C b A a B c D e E f G d

d G f E e D c B a A b C d l i K e L j J k ／ a F g H h
d G f E e D c B a A b C d l i K e L j J k ／ h H g F a
k J j L e K i l d C b A a B c D e E f G d ／ a F g H h
k J j L e K i l d C b A a B c D e E f G d ／ h H g F a

EXAMPLE OF CONCATENATED ROUTES (Nmin = 2)

FIG. 27



FLOWCHART OF MUTUAL CONNECTION OF Rbuf AND COMPUTATION OF TOTAL LENGTH

FIG. 28

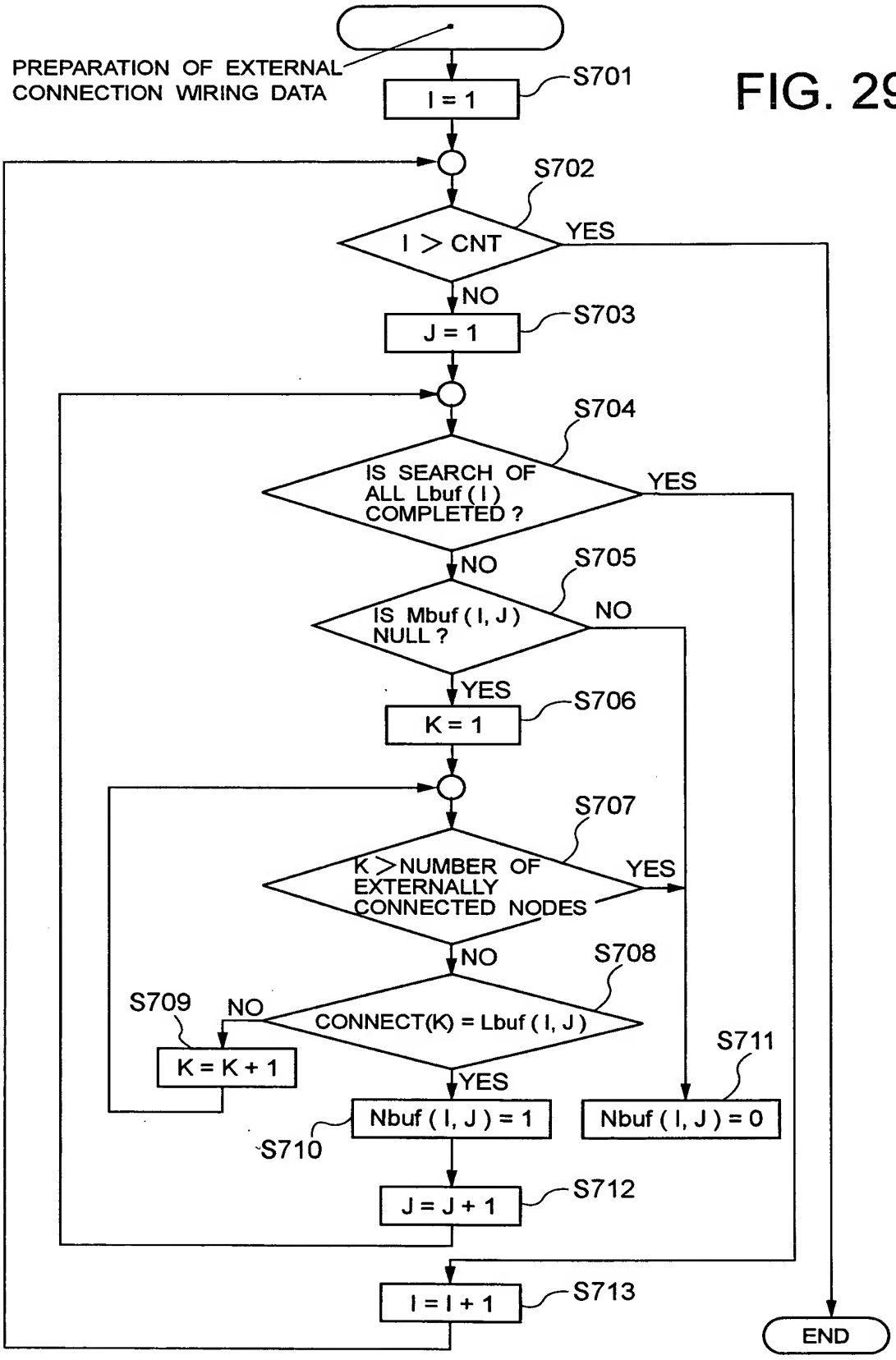
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	SUM
Rbuf	a	F	g	H	h	/	d	G	f	E	e	D	c	B	a	A	b	C	d	I	i	K	e	L	j	J	k	
M( )	14						12				12																	38
Rbuf	a	F	g	H	h	/	k	J	j	L	e	K	i	I	d	C	b	A	a	B	c	D	e	E	f	G	d	
M( )	18										12				12													42
Rbuf	h	H	g	F	a	/	d	G	f	E	e	D	c	B	a	A	b	C	d	I	i	K	e	L	j	J	k	
M( )					10		12				12																	34
Rbuf	h	H	g	F	a	/	k	J	j	L	e	K	i	I	d	C	b	A	a	B	c	D	e	E	f	G	d	
M( )					14						12				12													38
Rbuf	d	G	f	E	e	D	c	B	a	A	b	C	d	I	i	K	e	L	j	J	k	/	a	F	g	H	h	
M( )	12				12				14																			38
Rbuf	d	G	f	E	e	D	c	B	a	A	b	C	d	I	i	K	e	L	j	J	k	/	h	H	g	F	a	
M( )	12				12				18																			42
Rbuf	k	J	j	L	e	K	i	I	d	C	b	A	a	B	c	D	e	E	f	G	d	/	a	F	g	H	h	
M( )					12				12				10															34
Rbuf	k	J	j	L	e	K	i	I	d	C	b	A	a	B	c	D	e	E	f	G	d	/	h	H	g	F	a	
M( )					12				12				14															38

Rbuf AND ARRAY M HAVING SMALLEST SUM ARE STORED IN Lbuf AND Mbuf

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Lmin
Lbuf(1)	h	H	g	F	a	/	d	G	f	E	e	D	c	B	a	A	b	C	d	I	i	K	e	L	j	J	k	
Mbuf(1)					10		12				12																	34
Lbuf(2)	k	J	j	L	e	K	i	I	d	C	b	A	a	B	c	D	e	E	f	G	d	/	a	F	g	H	h	
Mbuf(2)					12				12				10															34

EXAMPLE OF CONCATENATED ROUTES Rbuf, MUTUAL CONNECTION DATA M AND TOTAL MUTUAL CONNECTION WIRING LENGTH

FIG. 29



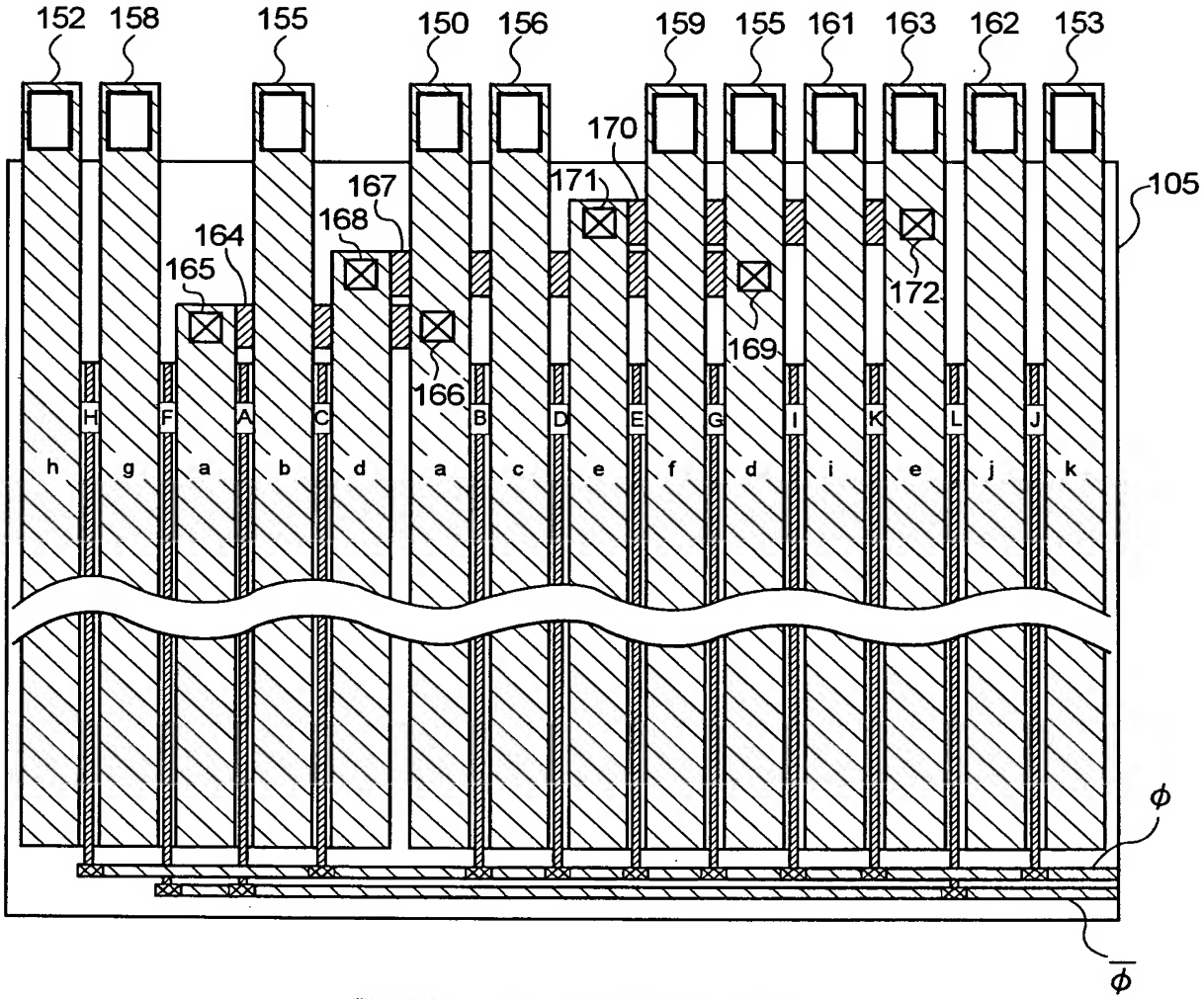
FLOWCHART OF PREPARATION OF EXTERNAL CONNECTION LINE DATA

FIG. 30

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Nmin	Lmin
Lbuf(1)	h	H	g	F	a	A	b	C	d	/	a	B	c	D	e	E	f	G	d	l	i	K	e	L	j	J	k	2	
Mbuf(1)					6				10						8														24
Nbuf(1)	1	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	1	0	1	0	1		
Lbuf(2)	k	J	j	L	e	K	i	l	d	G	f	E	e	D	c	B	a	/	d	Ç	b	A	a	F	g	H	h	2	
Mbuf(2)					8				12								6												24
Nbuf(2)	1	0	1	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	0	1	0	1	0	1	0	1		

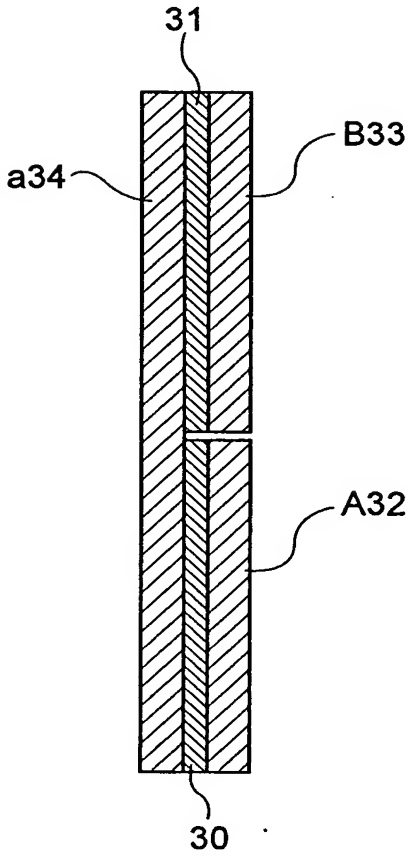
RESULTS OF EXECUTION OF AUTOMATIC LAYOUT ALGORITHM

FIG. 31



EXAMPLE OF AUTOMATIC LAYOUT

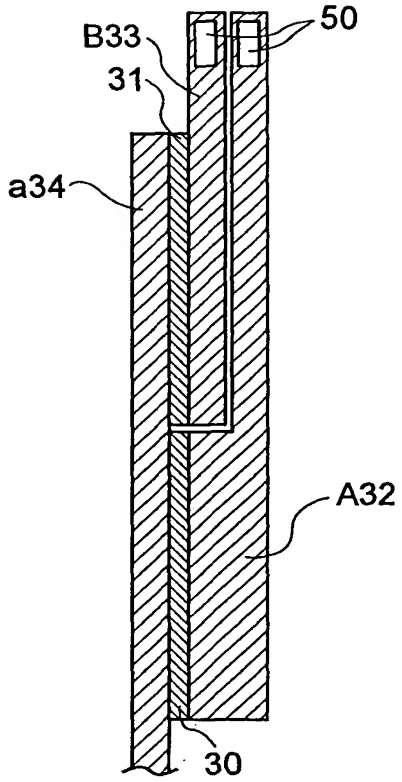
FIG. 32 PRIOR ART



EXAMPLE OF ORDINARY LAYOUT

FIG. 33

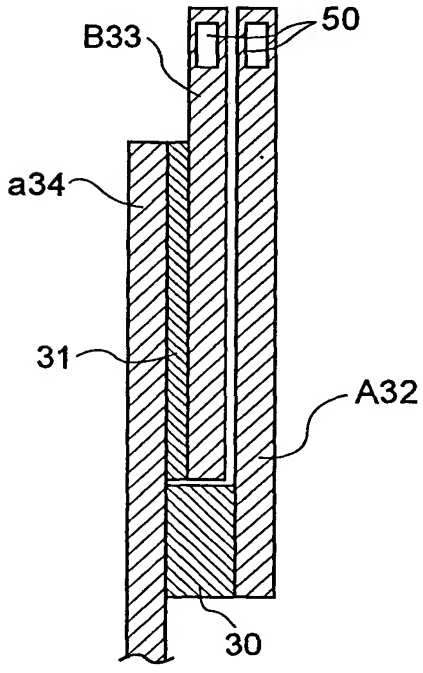
PRIOR ART



EXAMPLE OF ORDINARY LAYOUT

FIG. 34

PRIOR ART



EXAMPLE OF ORDINARY LAYOUT